Strawberry VARIETIES

IN THE UNITED STATES

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NEW STRAWBERRY varieties are constantly being introduced to the trade. Many of them possess special value as compared with others already more or less known, but most of them soon disappear from nurserymen's lists or at best remain of only local importance. From time to time a new variety which has sufficient value to give it a somewhat permanent place in the strawberry industry is introduced; as its merits become more widely known, its planting is increased accordingly.

For these reasons no list of varieties recommended for planting in any district can be regarded as permanent. It is subject to change as valuable new introductions or little-known varieties of value come into prominence and their merits and range of adaptation become known.

This bulletin is intended as an aid to both commercial and amateur strawberry growers in the selection of varieties best suited to their needs and conditions. The information is based largely on the experience of successful growers in practically every important commercial strawberry-producing district throughout the country; but the results of tests at agricultural experiment stations, the experience of commercial processors and byproducts manufacturers, the preferences of amateur fruit gardeners, and the conclusions reached from wide personal observations have also been used in making up the variety lists which are given for different regions, sections, and districts. In addition, varieties having particular value for different purposes are grouped under appropriate headings.

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STRAWBERRY VARIETIES IN THE UNITED STATES[1]

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Contents

TESTING VARIETIES

THE TESTING of varieties of strawberries has long been carried on by private individuals, nurserymen, and agricultural experiment stations. Where such tests have been made on soils and under conditions typical of considerable areas they have been valuable. To be of greatest value, however, the tests must be continued for several years, because conditions vary from year to year and strawberries respond quickly to changes in weather and soil. The varieties selected for extensive commercial growing should be those that after several years' trial show the best average record for productiveness and ability to meet commercial demands.

The recommendations made in this bulletin are based upon the experience of strawberry growers, nurserymen, and workers at agricultural experiment stations throughout the country. Observations have also been made in important representative strawberry-growing sections and on breeding grounds and test plots at the time the berries were ripening; the condition of the fruit on arrival in the larger markets has been studied also.

[1] For further information as to varieties of strawberries and their cultivation the reader is referred to the following Farmers' Bulletins: 901, Everbearing Strawberries (out of print; can be consulted in libraries); 1026, Strawberry Culture: South Atlantic and Gulf Coast Regions; 1027, Strawberry Culture: Western United States; and 1028, Strawberry Culture: Eastern United States.

[2] Original bulletin written by George M. Darrow.

ORIGIN OF CULTIVATED STRAWBERRIES

Modern strawberry varieties have been derived chiefly from two American species—the wild meadow strawberry of eastern North America (*Fragaria virginiana*) and the beach strawberry found along the beaches of the Pacific coast from Alaska to California and along the coast of Chile (*F. chiloensis*). The beach strawberry is also found on the mountains of the Hawaiian Islands. These two species were taken to Europe and hybridized there to produce the forerunners of the modern strawberry varieties.

Both wild species show many variations, and cultivated sorts show even more. Some varieties produce no runners; others have five leaflets to each leaf; and still others have fruit of various shapes, sizes, colors, and flavors. There are, however, no pure-white cultivated varieties, though some are white with a slight pink color on one side. Nor is there a "bush strawberry," though the old crowns of most varieties may become woody.

No fertile hybrids of the strawberry with other fruits have been produced. The so-called "strawberry-raspberry" is a raspberry species from Asia, and the "strawberry bushes" or "trees" are various plants that are not strawberries at all.

DEVELOPMENT OF THE STRAWBERRY INDUSTRY

Commercial strawberry growing began in the United States about 1800. At that time the principal interest was in the vicinity of the four largest cities, Boston, New York, Philadelphia, and Baltimore. The industry remained largely in those districts until about 1860, when the growing of the Wilson variety, which originated in 1851, became general. During this period several varieties were popular at one time or another. The Large Early Scarlet was the principal one; others, such as the Early Hudson, Hudson's Bay, Crimson Cone, Red Wood, and Hovey, were also grown to some extent.

From 1860 to about 1885 the Wilson was the principal variety grown. This was a much better shipping variety than any previously known; with its introduction commercial strawberry growing developed rapidly. As early as 1835 strawberry growing had reached commercial importance in the vicinity of Rochester, N. Y. In this district the Wilson first became generally grown, and until about 1930 it was grown there for canning. With the introduction of the Wilson, strawberry growing in New Jersey first began to shift from the vicinity of New York to southern New Jersey. After the Civil War, boat shipments of strawberries from the vicinity of Norfolk, Va., were sent to the New York market. At this time strawberry growing also began to develop rapidly on the Delmarva Peninsula, and southwestern Michigan and southern Illinois began supplying the Chicago market with strawberries.

The rapid extension of railroads and the introduction of refrigeration in transit led to the further extension of strawberry growing into Tennessee, central Arkansas, Louisiana, and northern Florida between 1870 and 1890. Since 1890 North Carolina, central Florida, Alabama, the Ozark section of Arkansas and Missouri, the Santa Clara Valley of California, and the Pacific Northwest have become important strawberry-growing sections.

Until the Dunlap, which was originated at Urbana, Ill., was

introduced in 1900, the growing of strawberries in much of the upper Mississippi Valley was difficult and too uncertain to be profitable. Now, however, strawberries are grown in home gardens in nearly all of this region and for market throughout a large part of it. The Dunlap and Beaver, which are the leading varieties grown in the northern part of the North Central States, are hardy and productive and in the Northern States resistant to disease. The Howard 17 (Premier) has been grown extensively as far north as Minnesota but is not quite so hardy as the Dunlap and Beaver.

Although strawberries were introduced early and grown commercially in Florida, Louisiana, and Texas, south of the regions where the wild strawberry is found, the industry in the Southern States has developed most rapidly since the introduction of varieties that originated in that region. The Neunan, originating at Charleston, S. C., and introduced about 1868, began to replace the Crescent and Wilson about 1870, but the last two were important commercial varieties up to 1890. The Cloud, originating near Independence, La., was much grown with Neunan as a pollinizer. The Hoffman, originating near Charleston, S. C., from seed of the Neunan, became the most important variety in many of the South Atlantic and Gulf States from 1890 to 1905. The Thompson (Lady Thompson), which originated at Mount Olive, N. C., prior to 1891 and came into prominence about 1898, and Michel (early), which originated in Arkansas in 1886 and came into prominence in 1897, were the leading commercial sorts in the South from that time until the Klondike and Missionary became well known. For several years these two varieties were planted in the South for shipment almost to the exclusion of all others. The Klondike originated near Hammond, La., and was introduced in 1901. The Missionary was introduced in 1906, some 6 years subsequent to its origin in Norfolk County, Va. The Blakemore, introduced in 1929 by the United States Department of Agriculture, has already supplanted both varieties in a part of the Southern States from Maryland to Missouri southward to within 50 to 100 miles of the Gulf of Mexico.

Many varieties especially adapted to the conditions in various parts of the country are now grown. (See figs. 7 to 9.) The Missionary, for example, is now almost the only variety grown in Florida. The Massey is the principal variety in the Wallace, N. C., district and the Klondike in the Chadbourn, N. C., district. The Blakemore is grown northward along the Atlantic coast from Norfolk, Va., to Delaware. The Klonmore is the principal variety in Louisiana; the Blakemore in most other parts of the South; the Aroma in the milder parts of the Central States—southern Indiana, Illinois, and Missouri and central and western Kentucky; the Beaver and Dunlap in the upper Mississippi Valley region; the Marshall (Banner, Oregon), Nick Ohmer, Shasta, Redheart, Brightmore, and Klondike in most parts of the Pacific Coast States; and the Howard 17 (Premier) and Catskill in northern Illinois, Indiana, Ohio, Pennsylvania, New Jersey, and northward east of the Mississippi and north of the Aroma section west of the Mississippi. The Fairfax and Dorsett are grown chiefly in Delaware, Maryland, and Virginia.

Aside from the varieties just named few are grown extensively except in the Northeastern States. In that section, however, other sorts, including the Chesapeake, Joe, Clermont, Sparkle, Lupton, and Aber-

deen, are grown. Where irrigation is used in the Northeastern States the Chesapeake has been the principal variety planted.

The extent of the strawberry industry in the United States is shown in figures 1 and 2. Figure 1 is based on the census statistics of 1939 and includes the total acreage for home and local markets as well as for shipment to general markets. Figure 2 is based on commercial shipments and shows the large centers of commercial production.

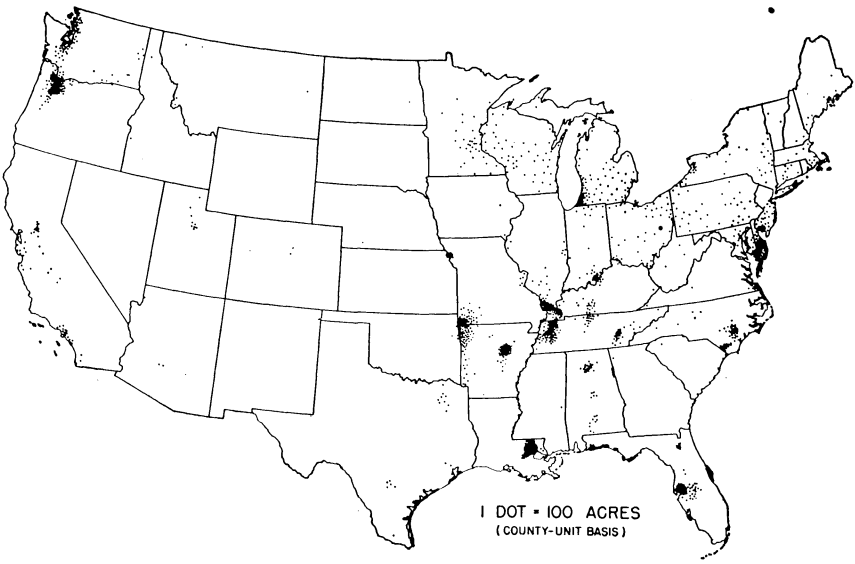

***Figure 1.*—Outline map of the United States showing the strawberry acreage harvested in 1939; total acreage for United States 175,217 acres. (Data furnished by Bureau of the Census.)**

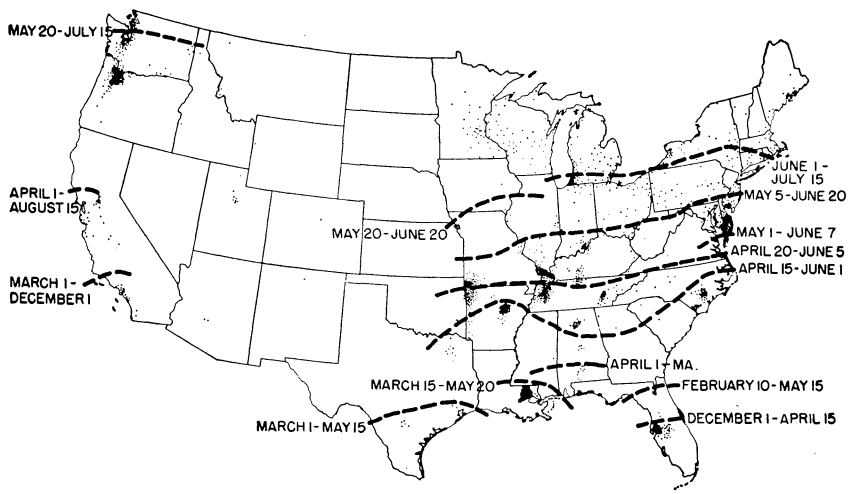

***Figure 2.*—Outline map of the United States showing the location of the principal commercial strawberry-producing sections, the approximate periods of ripening in each, and the progression of the strawberry season northward. (Data furnished by the Bureau of Agricultural Economics.)**

ADAPTATION OF VARIETIES

In the United States 15 varieties of strawberries are grown rather extensively. Some of these will doubtless be discarded when others better in quality and better adapted to particular conditions or uses have been introduced. Some of them are suitable for very restricted sections of the country and for particular conditions and uses in those sections. Others are more widely adapted and may be used for many purposes.

In addition to these 15 sorts about a score of others are raised to a slight extent, but most of them are inferior in productiveness, firmness, or some other characteristic of commercial importance.

ADAPTATION TO CLIMATE

Regional adaptation of strawberry varieties depends largely on three characteristics—the need for a winter rest period or the ability to do without it, the response to long or short days, and the response to hot or cool summers. The Missionary, Klonmore, Blakemore, and Klondike are adapted to the Southern States because they require limited amounts of cold or no rest period during the winter but grow vigorously and form fruit buds during the short days of late fall, winter, and early spring. They also endure the hot southern summers. Of these four sorts the Missionary is the most southern, the Klonmore next, the Klondike next, and the Blakemore the most northern. The Blakemore does best with some cold in winter. In contrast, most northern varieties seem to need a rest period during winter and grow but little during the short winter days. They are adapted to a cool climate where they remain dormant during the winter and flower and fruit during the long days of early summer.

The long, dry summers of the Pacific Northwest hinder the development of leaf spots and make it possible to grow varieties like the Marshall and the Redheart, which are susceptible to these diseases. There are other climatic conditions not fully understood that limit the growing of the western varieties in the East and eastern varieties in most of the West. As stated on page 3, the Dunlap, the Beaver, and a few other sorts are hardy in the upper Mississippi Valley. Most varieties cannot withstand the cold, drying winters of that part of the country.

ADAPTATION TO SOIL AND OTHER LOCAL CONDITIONS

Besides having climatic adaptation, varieties in the Northeastern States have shown a striking adaptation to local conditions. This local adaptation is due largely to difference in the number and vigor of the plants in a given area of matted row. If the soil is fertile and the moisture ample, varieties such as Blakemore and Dorsett that express plant vigor in the production of many runners may make such a dense mat of plants that few fruits are produced. If, however, runners are removed from plants of these varieties after the plants in a full stand spaced 9 to 12 inches have rooted, extremely high yields may be obtained. Plant vigor is then expressed in the formation of many crowns, many fruit buds, and much fruit. Local adaptation is the response of a variety to soil fertility, moisture supply, early or late planting, good or bad cultivation, and similar factors. If the conditions are such as to produce a full stand of properly spaced, large, many-crowned plants

by September 1, then the variety is well adapted locally. However, in even the adjoining field conditions may be such as to result in a poor stand or in a dense stand of small plants; then the variety is not adapted to the growing conditions of the field.

Soil Requirements of Different Varieties

The soil requirements of the different varieties are less important than the climatic requirements. Certain varieties, like the Klondike, Howard 17 (Premier), and Dunlap, are adapted to a very wide range of soils, whereas others, such as the Aroma, Corvallis, Redheart, Narcissa, and Ettersburg 121, are much more exacting. The Aroma seems best adapted to a fairly heavy soil, such as a heavy silt loam, but the Ettersburg 121 does best on a clay loam. The Narcissa grows best on fertile sandy loams well supplied with moisture and the Redheart on the deep red hill soils of western Oregon and Washington. One of the reasons for the differences in soil adaptation is the amount of moisture the roots of the various varieties can absorb from different soils. The number and size of runner plants such varieties produce have even greater influence on their adaptation. The root systems of different varieties differ greatly in size (fig. 3). By studying the response of

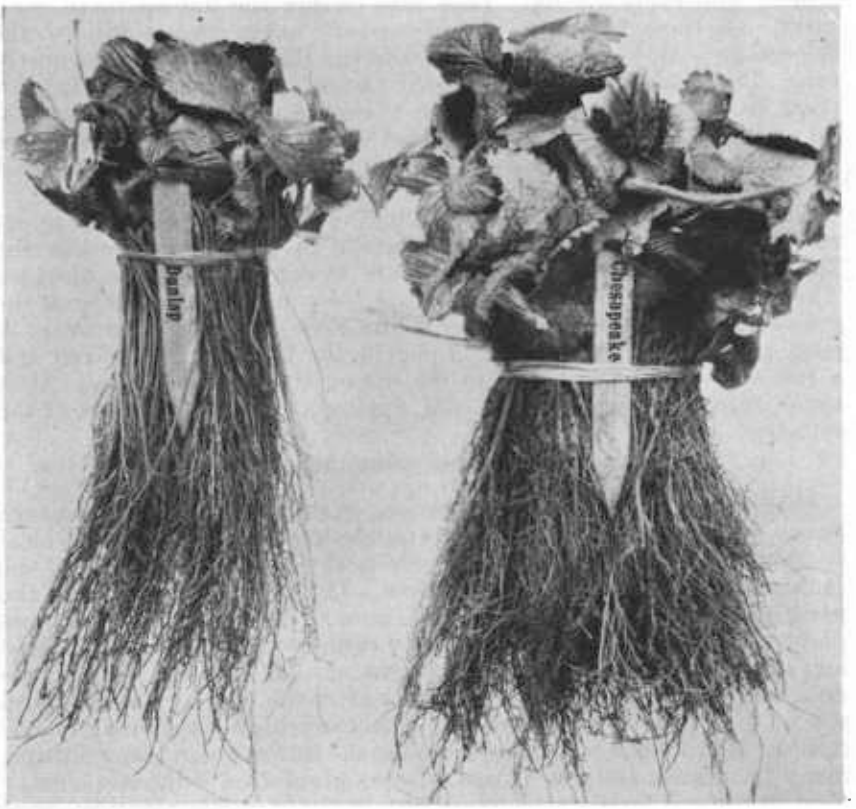

Figure 3.—**Bundles of Dunlap and Chesapeake strawberry plants, showing the differences in their root systems. Each bundle contains 27 plants of average size.**

different varieties when grown in different soil types, it is possible to select sorts adapted to most farm lands. When the soil adaptations of the varieties are known, they are included in the descriptions given on pages 26 to 30.

Special Requirements of Different Varieties

Certain varieties are suited to certain special conditions, such as irrigation and intensive garden culture. For example, the Chesapeake is the variety best liked by those growing strawberries under irrigation in the Northeast. This variety, which often fails to make a sufficient number of plants to produce profitable crops under nonirrigated conditions, makes an excellent stand and gives very large yields when irrigated. Likewise, the Marshall, Glen Mary, and some others that do not yield satisfactorily under ordinary field treatment in the Northern States produce very large crops when grown under intensive garden culture and when fertilized with stable manure.

Varieties that fruit well in certain localities may, nevertheless, be undesirable there. Some late sorts, for instance, produce good crops in parts of the South, but because they ripen after the fruit grown farther north is supplying the markets they are unprofitable for the commercial grower. The more southern growers who produce late berries cannot usually compete with growers located much nearer the northern markets, to which the fruit is largely shipped. The sequence of the shipping periods in the different sections is shown in figure 2. In Florida berries ripen during the winter, while farther north they ripen in succession. Each grower, therefore, must select varieties that ripen in his locality at a time when the markets to which he ships are not fully supplied from other districts more favorably situated than his for supplying the demand.

Persons growing berries for the home table and the local market should plant a variety of high quality which ripens through a long season, or they should grow several sorts which ripen in succession. In the vicinity of Washington, D. C., for instance, the Midland or Fairfax may be grown to supply the local early market and the Fairpeake or Redstar as a late-ripening sort.

COMPARATIVE FERTILITY OF PERFECT- AND IMPERFECT-FLOWERED VARIETIES

Strawberries produce two general types of flowers—imperfect (pistillate) and perfect. Imperfect flowers contain pistils but not stamens, whereas perfect flowers contain both pistils and stamens (fig. 4). Pollen, which is produced in the stamens, is essential to the setting of fruit. A variety with perfect flowers, therefore, can produce fruit when planted by itself, but one with imperfect flowers cannot set fruit unless perfect-flowering plants are nearby to furnish pollen through the agency of bees or other insects. Because of this, varieties having imperfect flowers are not so desirable as those having perfect flowers and fewer of them are grown. However, some of the sorts having imperfect flowers, or imperfect varieties as they are commonly called, are very productive and are liked in certain sections, as for example, the Burgundy in Minnesota and the Sample in northern New England.

Figure 4.—**Strawberry flowers: *A*, Perfect flower, having both stamens and pistils; *B*, imperfect flower, having pistils but no stamens.**

Imperfect varieties also are injured less by the strawberry weevil than perfect sorts, since this insect feeds on pollen; in sections where this weevil is a serious menace, imperfect sorts have been grown in relatively large proportions. However, they form less than 1 percent of the total acreage devoted to strawberries in the United States, and their use appears to be decreasing.

Where imperfect varieties are used the usual practice in planting is to set one row of a perfect variety for every two or three rows of an imperfect one. Figure 4 shows both types of flowers.

Certain sorts, the Glen Mary and the Progressive of the ones most commonly grown, for example, under ordinary conditions produce flowers having both stamens and pistils; but frequently, under some weather conditions, they produce so few good stamens that they do not have sufficient pollen to insure the setting of fruit. When these varieties do not set well, a variety producing an abundance of pollen should be planted with them in the proportion that perfect varieties are usually planted with imperfect ones. Further, if these sorts are grown on very fertile soil less pollination trouble is experienced.

Nearly always all the flowers of pistillate-flowered varieties set fruit when pollinated. Rarely, however, do all the blossoms of perfect-flowered varieties set fruit. Though rain, frost, disease, and insect injury may prevent the setting of some flowers, the most common and most important cause of such failure is the sterility of the pistils. Flowers with sterile pistils appear normal, but they do not set fruit or set only nubbins. Under some conditions not 1 in 50 of the flowers of some varieties sets. For example, the Ettersburg 121 variety, which was one of the most productive of all varieties on certain heavy soil types in Oregon, did not set 1 flower in 100 on sandy soils at Glenn Dale, Md., whereas adjacent pistillate-flowered sorts set all or nearly all their flowers.

The first flower to open on a flower cluster is more likely to set than the later ones, and the last ones to open are most often sterile. On an average about one-third of the blossoms of cultivated perfect-flowered varieties are sterile. Those varieties that set the largest percentage of their flowers in any locality should be selected. Figure 5 shows a fruit cluster of the White Sugar variety in which only the

Figure 5.—**A fruit cluster of the perfect-flowered White Sugar variety. Note that two flowers had set fruit and several were sterile.**

first two flowers to open have set; all the others are sterile. In sections where as many flowers as shown are sterile such a variety would not be profitable. Figure 6 shows a fruit cluster of the Klondike variety in which all the flowers had set. Often, however, some of the flowers of the Klondike do not set fruit. Early-formed runner plants and plants spaced well apart have many fewer sterile flowers than later formed crowded plants.

FRUIT PRODUCTION AND GROWTH HABIT

Recent studies have shown that the value of varieties depends in a large part on their growth habit. One of the best types of growth for the Eastern States is that shown by the Howard 17 (Premier) and Dunlap, which tend to produce irregular low-branching flower clusters with relatively large berries. When the soil on which these varieties are grown is quite fertile their vigor is expressed in branch crowns and increased size of low-branching irregular flower clusters that bear many large berries. In contrast, the Missionary and Klondike varieties on sandy soil, near Washington, D. C., tend to produce small flower clusters which are high-branching; when their vigor is increased, they tend to produce more runner plants than branch crowns or large flower clusters. Farther south, however, the Missionary and Klondike tend to the growth habit represented by the Howard 17 and Dunlap. A third growth habit is that illustrated by the Portia, a Canadian variety, when grown near Washington. When its vigor is increased its growth habit tends toward a few branch crowns, larger, high-branching flower clusters, and many small berries. Its growth near Washington represents a habit much less desirable than that of the Howard 17.

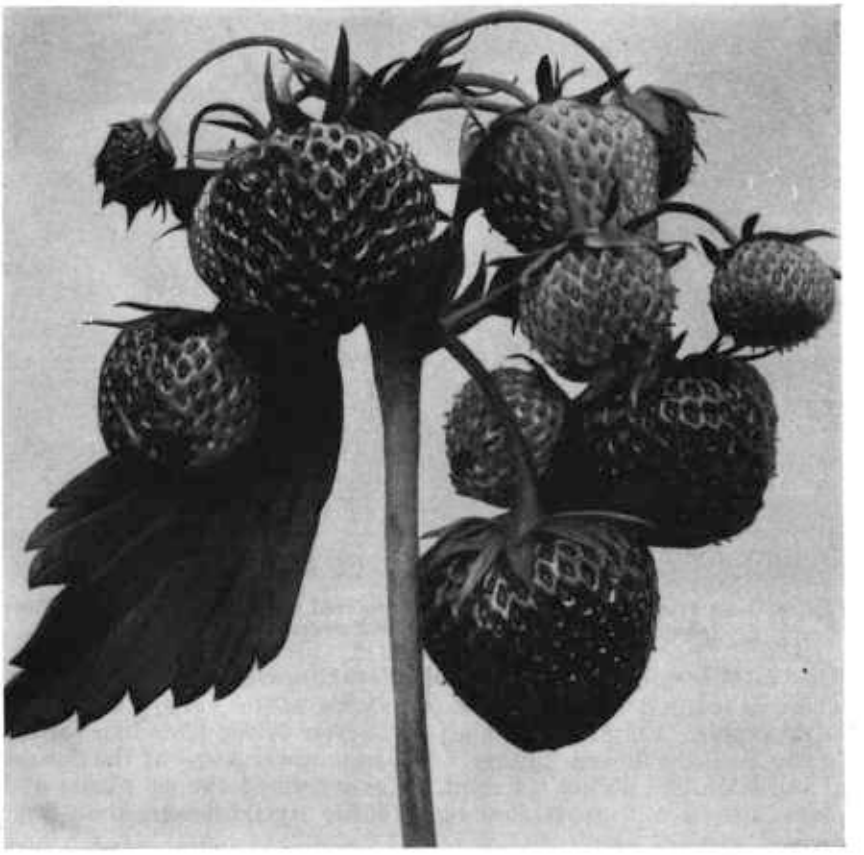

Figure 6.—**A fruit cluster of the perfect-flowered Klondike variety, showing fruit set by all flowers.**

VARIETIES FOR DIFFERENT STATES

For the purpose of obtaining information on the varieties best adapted to different sections, a large number of commercial growers in the most important producing districts in all parts of the United States were requested to give the names of the leading sorts in their localities, together with information on the acreage, relative importance, and merits of each variety as grown under their conditions. In addition, personal visits were made to nearly all important commercial sections and most of the State agricultural experiment stations assisted in furnishing information on strawberry varieties. The list given in table 1 was compiled from information thus obtained.

HOW TO USE THE LIST OF VARIETIES

The list in table 1 is arranged alphabetically by States and under the States often by the districts in which strawberries are grown commercially. The varieties are placed approximately in the order of their commercial importance in the different districts. In the column

headed "Season and use" the purpose for which each variety is especially adapted is given when particular merit is known to exist. In using the list the following points should be kept in mind:

(1) The varieties listed are suggestive only. Under certain local conditions other sorts may be fully as desirable as those named.

(2) In the Northeastern States several varieties having the same season of ripening are named. The choice of varieties under these conditions should be guided by the experience of neighbors, so far as it can be used, and by the extent of runner restriction practiced.

(3) The listing of varieties for certain districts and for certain States should not be construed as evidence that conditions therein are necessarily favorable to the development of a commercial strawberry industry. On the other hand, many districts not named in the lists are well adapted to strawberry growing, those mentioned being simply the ones in which the principal development has taken place.

(4) The fact that a variety is adapted to a certain purpose in one district is not necessarily evidence that it will be adapted to a similar purpose in another.

(5) In some localities the sequence of ripening is of great importance. The relative time of ripening given in this list, however, is only approximate. Conditions within a given section vary widely, and the time of ripening will be largely dependent on local conditions. Varieties for a particular district should be selected so that they will ripen at a time when the markets in which they are to be sold are not fully supplied from other districts more favorably located; otherwise, an undesirable competition is inevitable at times.

(6) With the increase of interest in strawberry breeding and increased knowledge of the work, better sorts are being originated continually. New varieties worthy to replace some of the standard sorts of the present time have already been produced and may be expected to come into prominence gradually. It is probable that still better varieties will be developed in the future.

(7) In selecting varieties for a place not specified in the list, one should choose sorts grown where the conditions are as nearly as possible like those of the place in question.

(8) The list should be used in connection with the descriptions of varieties given on pages 26 to 30 and with figures 7, 8, and 9.

TABLE 1.—*List of strawberry varieties arranged by States and districts*

[Names of imperfect varieties are followed by the abbreviation "imp." The lists show the varieties most commonly grown in the various sections. Those recommended for commercial planting are marked with an asterisk (*). Under "Season and use" early, everbearer, medium late, midseason, late, and so forth, relate to the season of fruitage and canning, dessert, general use, home use, main crop, local market, shipping, and so forth, show the purpose for which the variety is grown]

State, district, or locality, and variety	Season and use
Alabama	
South of Cullman:	
*Missionary	
*Blakemore	
Klondike	
Suwannee	Home use.
Cullman and north:	
*Blakemore	Early.
Aroma	Late.
Klondike	Early.
Missionary	Do.
Suwannee	Home use.
Fairfax	
Arizona	
*Missionary	Early.
Arizona	Late.
Klondike	Home use.
Arkansas	
*Blakemore	
Aroma	
Suwannee	
California	
Los Angeles:	
*Klondike	
Blakemore	
Missionary	
San Francisco:	
*Shasta	
*California Agricultural Experiment Station selections.	
North of Fresno:	
*Shasta	
*California Agricultural Experiment Station selections.	
South of Fresno:	
*Klondike	Shipping.
Blakemore	Do.
Missionary	Do.
Colorado	
*Dunlap	Medium early.
*Howard 17 (Premier).	Early.
Aroma	Late.
Cheyenne 2 and 3.	Home use.
Connecticut	
*Howard 17 (Premier).	Early.
*Fairfax	Early to midseason.
*Catskill	Do.
Hebron	Late.
Chesapeake	Do.
Midland	Early.
Shelton	Early.
Sparkle	Medium late.
Delaware	
*Blakemore	Early.
*Fairfax	Early.
*Dorsett	Do.
*Chesapeake	Late.
Fairpeake	Do.
Lupton	Do.
Joe	Midseason to late.
*Temple	Red-stele-resistant.
District of Columbia	
*Blakemore	Early.
*Dorsett	Do.
*Fairfax	Do.
*Midland	Do.
*Fairpeake	Late.
*Redstar	Very late.
Florida	
*Missionary	Practically no other planted.
Klonmore	For trial.
Georgia	
*Blakemore	Shipping.
Suwannee	Home use.
Missionary	Extreme south.

TABLE 1.—*List of strawberry varieties arranged by States and districts*—Continued

State, district, or locality, and variety	Season and use
Idaho	
Howard 17 (Premier).	Early.
*Rockhill	Everbearer.
Mastodon	Do.
*Glen Mary	Local market.
Marshall	Do.
Redheart	Freezing.
Blakemore	Shipping.
Illinois	
Anna district:	
*Blakemore	Early.
*Aroma	Medium late.
Northern district:	
*Howard 17 (Premier).	Early.
Dunlap	Midseason.
Fairfax	Medium early.
Mastodon	Everbearer.
Indiana	
*Howard 17 (Premier).	Early.
*Aroma	Shipping (southern part).
*Catskill	Midseason.
Mastodon	Everbearer.
Fairfax	Early.
Iowa	
Keokuk:	
*Howard 17 (Premier).	Early.
*Blakemore	Do.
Dunlap	Midseason.
Throughout the State:	
*Dunlap	Do.
*Beaver	Early.
Catskill	Early to midseason.
Howard 17 (Premier).	Early.
*Rockhill (Wazata).	Everbearer.
Kansas	
Doniphan County:	
*Aroma	Late.
*Blakemore	Early.
Howard 17 (Premier).	Do.
Mastodon	Everbearer.
Kansas—Continued	
Throughout the State:	
*Dunlap	Hardy.
*Aroma	Shipping.
*Howard 17 (Premier).	Early.
*Blakemore	Do.
Fairfax	Trial.
Catskill	Early to midseason.
Kentucky	
*Aroma	Late.
*Blakemore	Early; chief variety.
*Howard 17 (Premier).	Early (Louisville district).
*Dorsett	Early.
*Fairfax	Do.
*Catskill	Early to midseason.
Tennessee Shipper.	Do.
*Tennessee Beauty.	Midseason.
Louisiana	
Southern part:	
*Klonmore	Very early.
*Klondike	Midseason.
Northern part:	
Blakemore	Early.
Suwannee	Home use.
Maine	
*Dunlap	Midseason.
*Howard 17 (Premier).	Early.
Belt (William Belt).	Midseason.
Mastodon	Everbearer.
Catskill	Early to midseason.
Maryland	
Eastern Shore:	
*Blakemore	Early; barreling, shipping.
*Temple	Red-stele-resistant.
*Fairfax	Early.
Midland	Freezing, shipping.
Dorsett	Early.
*Chesapeake	Late.
*Joe	Midseason to late.
Lupton	Late.
Fairpeake	Do.

TABLE 1.—*List of strawberry varieties arranged by States and districts*—Continued

State, district, or locality, and variety	Season and use
Maryland—Con.	
Western part:	
*Blakemore	Early.
*Howard 17 (Premier).	Do.
*Fairfax	Do.
*Catskill	Early to midseason.
Dorsett	Early.
Redstar	Very late.
Fairpeake	Late.
Suwannee	Home use.
Massachusetts	
Falmouth:	
*Howard 17 (Premier).	Early.
Throughout the State:	
*Howard 17 (Premier).	Early.
*Catskill	Early to midseason.
Fairfax	Medium early.
Midland	Early.
Sparkle	Late midseason.
Redstar	Very late.
Mastodon	Everbearer.
Michigan	
*Dunlap	Northern part chiefly.
*Howard 17 (Premier).	Early.
*Robinson	Late.
Gem	Everbearer.
Mastodon	Do.
Fairfax	Medium early.
Catskill	Early to midseason.
Minnesota	
Northern part:	
*Beaver	
*Dunlap	
Howard 17 (Premier).	
Burgundy (imp.).	New; late.
Southern part:	
*Howard 17 (Premier).	Early.
*Beaver	
Burgundy (imp.).	New; late.
*Rockhill (Wazata).	Everbearer.
Evermore	Do.
Catskill	Early to midseason.
Mississippi	
Southern part:	
*Klondike	
*Klonmore	
Central and northern part:	
*Blakemore	
*Klonmore	
Suwannee	Home use.
Missouri	
Ozark section:	
*Aroma	Late.
*Blakemore	Early.
Fairfax	Do.
Catskill	Early to midseason.
North of Missouri River:	
*Blakemore	Early; shipping.
*Howard 17 (Premier).	Early; local market.
Gem	Everbearer.
Mastodon	Do.
Catskill	Early to midseason.
Aroma	Late.
Montana	
*Dunlap	Midseason.
*Montana Progressive.	Everbearer.
Nebraska	
*Dunlap	Midseason.
Progressive	Everbearer.
Mastodon	Do.
Cheyenne 2 and 3.	Home use.
Nevada [1]	
New Hampshire	
*Howard 17 (Premier).	Early.
Dunlap	Midseason.
Gem	Everbearer.
Mastodon	Do.
New Jersey	
Southern district:	
*Lupton	Late.
Chesapeake	Irrigated fields.
*Sparkle	Midseason to late.

[1] Varieties grown in Utah and California should be tried.

TABLE 1.—*List of strawberry varieties arranged by States and districts*—Continued

State, district, or locality, and variety	Season and use
New Jersey—Con.	
Southern district–Con.	
*Joe	Early to midseason.
*Blakemore	Early.
*Fairfax	Medium early.
*Catskill	Early to midseason.
*Pathfinder	Early.
Northern district:	
*Howard 17 (Premier).	Do.
*Sparkle	Midseason to late.
*Joe	Do.
*Catskill	Early to midseason.
Pathfinder	Early.
Chesapeake	Late; irrigated fields.
New Mexico	
*Missionary	
Dunlap	
Arizona	
Klondike	
New York	
Western New York:	
*Howard 17 (Premier).	Early.
*Catskill	Early to midseason.
Clermont	Do.
Hudson River Valley:	
*Howard 17 (Premier).	Early.
*Sparkle	Midseason to late.
*Catskill	Early to midseason.
Throughout the State:	
*Howard 17 (Premier).	Early.
*Catskill	Early to midseason.
*Clermont	Do.
*Sparkle	Midseason to late.
Fairfax	Early to midseason.
Redstar	Very late.
Mastodon	Everbearer.
Gem	Do.
Rockhill (Wazata)	Do.
North Carolina	
Chadbourn:	
*Klondike	Early.
Wallace district:	
*Massey	Late.
*Blakemore	Early.
Missionary	Do.
Suwannee	Home use.
Western part:	
*Howard 17 (Premier).	Early.
*Blakemore	Do.
Fairfax	Dessert.
Suwannee	Do.
Catskill	Early to midseason.
Midland	Early.
North Dakota	
Dunlap	Midseason.
Beaver	Early.
Howard 17 (Premier).	Do.
Progressive	Everbearer.
Ohio	
Southern district:	
*Howard 17 (Premier).	Early.
*Aroma	Medium late.
Northern district:	
*Howard 17 (Premier).	Early.
Gandy	Late.
Chesapeake	Do.
Mastodon	Everbearer.
Catskill	Early to midseason.
Fairfax	Early.
Sparkle	Midseason.
Oklahoma	
*Blakemore	Early.
*Aroma	Late.
Fairfax	Early.
Oregon	
Willamette Valley:	
*Narcissa	Very early; local market.
*Marshall	Freezing; principal variety.
*Corvallis	Home canning, freezing.

TABLE 1.—*List of strawberry varieties arranged by States and districts*—Continued

State, district, or locality, and variety	Season and use
Oregon—Continued	
Willamette Valley—Continued	
*Redheart	Freezing, canning.
*Rockhill (Wazata.)	Everbearer.
*Streamliner	Do.
Brightmore	Early; freezing, preserving.
Eastern part:	
*Marshall	Freezing, local market.
*Streamliner	Everbearer.
Pennsylvania	
*Howard 17 (Premier).	Early.
*Joe	Midseason to late.
*Sparkle	Do.
*Catskill	Early to midseason.
*Fairfax	Early.
Mastodon	Everbearer.
Dorsett	Early.
Rhode Island	
*Howard 17 (Premier).	Early.
Catskill	Early to midseason.
Mastodon	Everbearer.
Sparkle	Medium late.
South Carolina	
*Blakemore	Early.
Suwannee	Home use.
Klondike	
South Dakota	
Beaver	Early.
Dunlap	Midseason.
Rockhill (Wazata)	Everbearer.
Cheyenne 2 and 3.	Home.
Tennessee	
*Blakemore	Chief variety.
Tennessee Beauty.	Midseason; freezing.
Tennessee Shipper.	Medium early; freezing.
Tennessee Supreme.	Early; freezing.
Suwannee	Home use.
Fairfax	Early.
Texas	
San Antonio section:	
*Klondike	
*Missionary	
Ranger	
Houston:	
*Missionary	Main crop.
*Klondike	Do.
Ranger	
Tyler:	
*Klondike	
Ranger	
Blakemore	
Utah	
*Marshall	Midseason.
Brightmore	Freezing.
Chesapeake	Late.
Howard 17 (Premier).	Early.
Vermont	
*Howard 17 (Premier).	Early.
*Dunlap	Midseason.
Sample (imp.)	Late.
Belt (William Belt).	
Mastodon	Everbearer.
Green Mountain	Do.
Catskill	Early to midseason.
Virginia	
Western Virginia:	
*Blakemore	Early.
*Dorsett	Do.
*Fairfax	Do.
*Catskill	Early to midseason.
Suwannee	Home use.
Howard 17 (Premier).	Early.
Joe	Midseason to late.
Norfolk:	
*Blakemore	Early.
Suwannee	Home use.
Eastern Shore counties:	
*Blakemore	Early.
*Joe	Midseason.
*Temple	Red-stele-resistant.
Suwannee	Home use.
Fairfax	Early.

TABLE 1.—*List of strawberry varieties arranged by States and districts*—Continued

State, district, or locality, and variety	Season and use
Washington	
Western part:	
*Marshall	General use, freezing, and barreling.
Brightmore	Freezing, preserving.
*Narcissa	Very early; local market.
Corvallis	On heavy soils; canning, freezing.
Redheart	Canning, freezing.
Spokane:	
Howard 17 (Premier).	Early.
Dorsett	Do.
Fairfax	Do.
Culver	Do.
Yakima Valley:	
Wray Red	Do.
Dorsett	Do.
Fairfax	Do.
Blakemore	Do.
West Virginia	
*Howard 17 (Premier).	Early.
*Blakemore	Do.
*Fairfax	Do.
*Catskill	Early to midseason.
Joe	Midseason to late.
Wisconsin	
*Dunlap	Midseason.
*Beaver	Light soils.
*Howard 17 (Premier).	Early.
*Rockhill (Wazata).	Everbearer.
Wyoming	
*Dunlap	
Cheyenne 2 and 3.	Home use.

It will be noted from table 1 that only a comparatively small number of varieties are grown extensively in this country; in some States only one sort is grown to any considerable extent. Many varieties listed, although important in some one locality, are comparatively unimportant when the industry as a whole is considered. Such varieties do not usually remain in cultivation long, for nurserymen do not find them so profitable to propagate as the widely grown sorts. Furthermore, local varieties are not known by the trade so well as the standard sorts, and the fruit is not wanted by buyers unless it is of exceptionally good quality and grade. Therefore, under ordinary conditions, growers who ship to the general markets should raise only well-known varieties.

IMPORTANCE OF THE VARIETIES

In table 2 the varieties are listed in the order of their importance in the United States on the basis of the acreage planted to each. The table gives the approximate percentage of the total acreage devoted to each variety in 1945.

Fifteen varieties constituted about 94 percent of the total commercial strawberry acreage in the United States in 1945. The first five—the Blakemore, Howard 17 (Premier), Marshall, Klondike, and Klonmore—were grown on about 71 percent of the acreage. The Blakemore variety was not introduced until 1929; less than 15 years later, how-

ever, it was the leading variety in the United States. Its acreage is still increasing. This demonstrates the rapidity with which a variety of superior merit comes into popular favor.

TABLE 2.—*Principal strawberry varieties in the United States in the order of their importance in 1945 on the basis of the established acreage of each*

Rank	Variety	Total acreage	Rank	Variety	Total acreage
		Percent			*Percent*
1	Blakemore	34	9	Fairfax	2
2	Howard 17 (Premier)	12	10	Lupton	2
3	Marshall	11	11	Redheart	1
4	Klondike	7	12	Beaver	1
5	Klonmore	7	13	Dorsett	1
6	Aroma	6	14	Massey	1
7	Missionary	4	15	Robinson	1
8	Catskill	4	-----	Other varieties	6

Of the varieties listed in table 2, 13 are known to have originated as the result of definite work for the production of better varieties. These constituted 78 percent of the total acreage in strawberries in the United States in 1945.

As indicated in table 2, other varieties besides the 15 named make up 6 percent of the total acreage. This percentage is composed principally of 13 varieties, as follows: Joe, Chesapeake, Shasta, Aberdeen, Pathfinder, Dunlap, Temple, Redstar, Sparkle, Gandy, Brightmore, Gem, and Mastodon. There are many other varieties in the trade, but they are grown to such a limited extent to be practically negligible from a commercial standpoint.

On the maps shown as figures 7, 8, and 9 are outlined the regions where the Blakemore, Klondike, Aroma, and certain other important varieties are principally grown. The regions thus outlined are approximate only and probably exclude small districts where these varieties are raised. They show, however, the wide distribution of certain varieties and suggest that many of them are adapted to wide variations in soil and climate.

VARIETIES FOR SPECIAL PURPOSES

Not all sorts are equally well suited to all purposes, and growers often use certain varieties for special markets. For home gardens several sorts ripening from early to late may be needed. In many localities where large quantities of berries are barreled or canned, varieties especially adapted to this purpose are needed.

VARIETIES FOR SHIPPING

When grown in regions to which they are adapted the following varieties are among the best for shipping to distant markets: Blakemore, Tennessee Shipper, Massey, Klonmore, Klondike, Tennessee Beauty, Aroma, Redheart, Fairfax, Missionary (from Florida), Lupton, and Nick Ohmer. The Dorsett is considered a good shipper from

eastern Washington but not from North Carolina, Virginia, and Maryland. The Missionary is usually a good shipper from Florida but not from North Carolina. The Tennessee Shipper and Blakemore are particularly good shipping sorts.

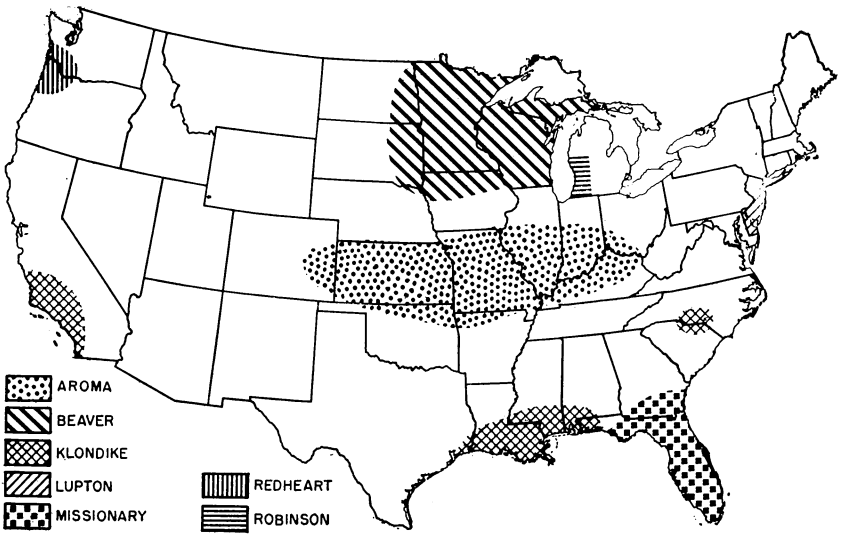

Figure 7.—**Outline map of the United States showing regions where the Aroma, Beaver, Klondike, Lupton, Missionary, Redheart, and Robinson varieties of strawberries are profitably grown. The Missionary variety is grown in some districts outside the region shown, but it is recommended only for that indicated. The Blakemore has largely replaced the Klondike and Missionary 50 to 100 miles north of the Gulf of Mexico and northward.**

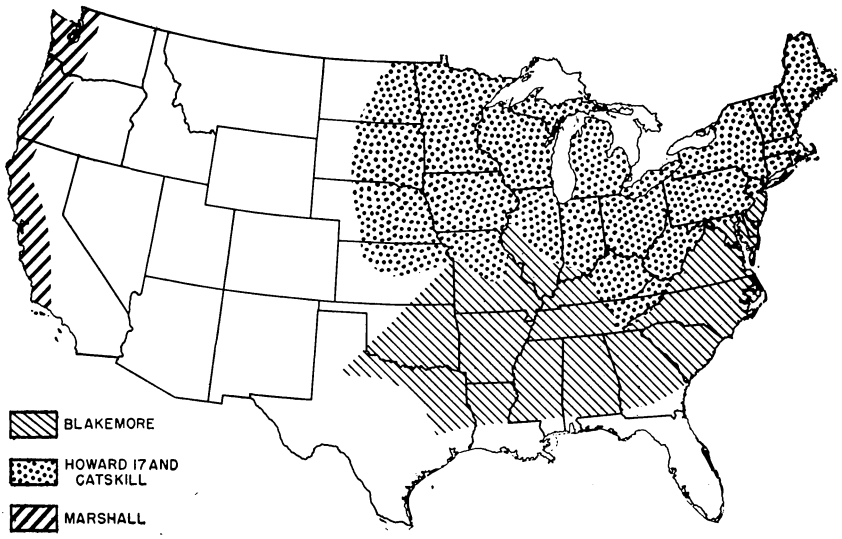

Figure 8.—**Outline map of the United States showing the regions where the Blakemore, Howard 17 (Premier), Catskill, and Marshall varieties of strawberries are grown extensively. Suwannee seems to be adapted to about the same region as that where the Blakemore is grown.**

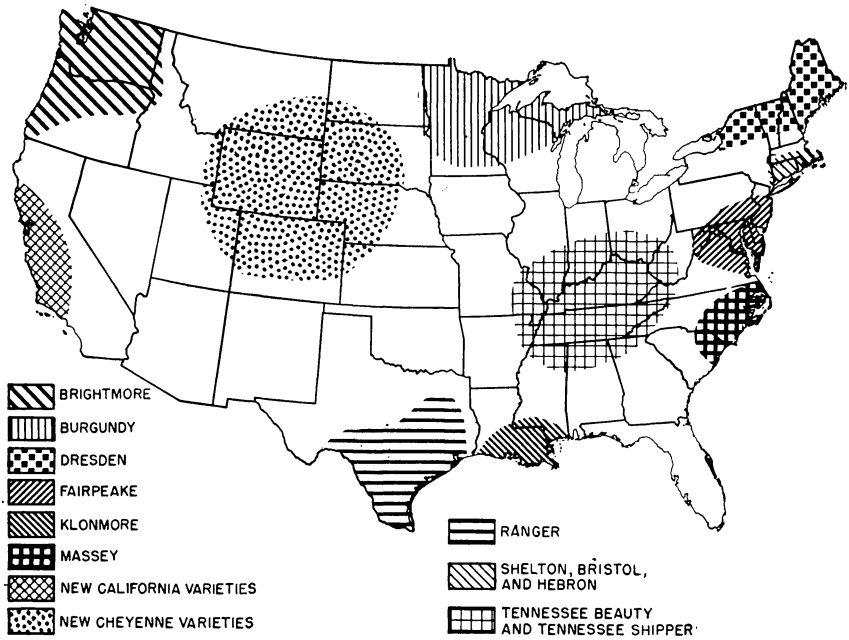

***Figure 9.*—Outline map of the United States showing regions where some of the newer varieties of strawberries are being grown or are suggested for trials.**

VARIETIES FOR DIFFERENT SEASONS

It is difficult to classify varieties according to their season of ripening because this period is influenced by local weather conditions, climate, exposure, soil, and treatment given the plantation. Thus the Missionary, which is an early variety in Maryland, may begin to bear in Florida in December and continue until May and June under favorable conditions. The Nick Ohmer and Marshall mature their fruit in June in Massachusetts, but on the coast of California they begin in April and fruit continuously until November. Weather conditions also affect the length of the ripening season, and in cool weather a variety that ordinarily ripens its crop in a short period may have a season extending over several weeks. Varieties are affected differently by cool weather; some that are early and ripen very rapidly in warm weather may be late and ripen very slowly when the weather is cool.

Because of the various factors that affect ripening any classification of varieties on the basis of season of ripening must be somewhat general. With this limitation in mind 30 important varieties can be classified as follows.

General classification and variety:	*Season of ripening*
Early varieties:	
Beaver	Early.
Blakemore	Do.
Brightmore	Do.
Clermont	Early to midseason.
Dorsett	Early.
Dunlap	Early to midseason.
Fairfax	Do.

General classification and variety—Continued	*Season of ripening*
Early varieties—Continued	
Howard 17 (Premier)	Early.
Klondike	Early to midseason.
Klonmore	Very early.
Maytime	Do.
Midland	Early.
Missionary	Do.
Narcissa	Very early.
Midseason varieties:	
Aberdeen	Midseason to late.
Catskill	Early to midseason.
Marshall	Do.
Redheart	Midseason.
Sparkle	Do.
Late varieties:	
Aroma	Midseason to late.
Chesapeake	Late.
Corvallis	Do.
Fairpeake	Do.
Joe	Midseason to late.
Lupton	Late.
Massey	Do.
Nick Ohmer	Midseason to late.
Redstar	Very late.
Robinson	Late.
Sample	Do.

VARIETIES BEARING FRUIT OF EXCEPTIONAL SIZE, FLAVOR, OR QUALITY

Among the varieties having large, showy fruit are the Marshall, Massey, Midland, Fairfax, Dorsett, Catskill, Chesapeake, Fairpeake, Shasta, Lupton, and Howard 17 (Premier). The largest and most showy fruits of any variety are produced under the hill system.

Many persons who cannot eat certain varieties of strawberries because of their high acidity can eat the milder flavored sorts without harm. The Fairfax, Fairmore, and Southland are considered the best for such use, as they are very mild. Other relatively mild-flavored sorts are the Marshall, Chesapeake, Belt, Temple, Dorsett, Redwing, Massey, Midland, and Fairpeake.

The dessert quality of strawberry varieties is affected to a large extent by climate and local weather conditions. Furthermore, varieties that appeal to certain individuals as being of very high quality do not so appeal to others. Some like varieties with a very mild flavor, while others like those having a pronounced flavor and considerable acidity. Varieties vary greatly from season to season in the same district and often have higher dessert quality toward the end of the season than at the beginning. Moreover, a variety may have good dessert quality in one district, but this quality may be poor in a district having a different climate. Thus, the Howard 17 (Premier) is almost insipid in eastern North Carolina but often has good quality in New York and New England. The Marshall, Dorsett, Fairfax, Fairpeake, Midland, Northstar, and Narcissa are among the varieties having the best dessert quality in the North, and all are usually mild in flavor. The Suwannee, Massey, Fairmore, and Southland are the best in quality of the southern varieties.

FROST-RESISTANT VARIETIES

Among the standard varieties the flowers of the Howard 17 (Premier) are much superior to those of other sorts in resistance to frost injury. The Chesapeake and Beaver are reported as more resistant than some other sorts. In the North wherever frosts are unusually serious, everbearing varieties are commonly grown instead of the ordinary spring-fruiting sorts.

DISEASE-RESISTANT VARIETIES [3]

There is a wide range of variation in the resistance of varieties to leaf diseases, which occur wherever strawberries are grown. In semiarid regions leaf diseases do little damage. They often cause serious injury in the North, but they are especially destructive in the Southern States. Varieties that are susceptible to these diseases, such as the Glen Mary, Aberdeen, Marshall, Klondike, and Redheart, are severely injured except in semiarid and northern regions. Some sorts, however, show marked resistance. The Howard 17 (Premier), Fairfax, Dorsett, Fairmore, and Rockhill are resistant to all leaf diseases. The Klonmore is resistant to leaf spot, but quite subject to leaf scorch. The Temple, Aroma, Massey, and Midland are also resistant to leaf spot.

The Marshall is very subject to virus diseases. The Brightmore is being grown in western Washington because of virus resistance. The Nick Ohmer and some of the new California varieties have replaced the Marshall to a considerable extent in California because they are more resistant to yellows, a virus disease. The Aberdeen, Fairland, and Temple are very resistant to the red stele root disease, the Sparkle is at least fairly resistant, and the Pathfinder is resistant enough to yield well on most soils infested with the fungus that causes this disease.

VARIETIES FOR PRESERVING, ICE CREAM, AND FREEZING

Varieties for preserving should be easy to cap, medium-sized, and firm and have a high flavor and a light, bright-red color that does not turn dark after preserving. For the ice-cream and frozen-fruit trade, varieties with a deep-red color and a high flavor are desired.

The best eastern preserving sort is the Blakemore, a variety adapted to the region from southern New Jersey to Georgia and west to Oklahoma. In the Pacific Northwest the Brightmore is the best preserving variety. For the ice-cream trade the Marshall and the Klondike are liked, though other kinds are used. Because of the low cost of production and the steady supply a large part of the berries for preserving and the ice-cream trade are packed in Oregon and Washington and are of the Marshall variety; however, the Brightmore is replacing it to some extent there.

For freezing for the package trade the Marshall, Redheart, Midland, Brightmore, Klondike, Corvallis, Dorsett, Redwing, Sparkle, and Julymorn are liked. The Joe, Culver, Tennessee Shipper, Tennessee Beauty, Burgundy, and Blakemore have been found above average for this purpose.

[3] For further information see Farmers' Bulletin 1891, Diseases of Strawberries.

VARIETIES FOR CANNING

Varieties for the canning trade should be productive and should bear medium-sized, firm-fleshed berries, separating readily from the calyx (hull cap), deep red to the center, and briskly subacid to acid in flavor. Berries having a color that does not fade readily when canned make the most attractive product and are the most desirable.

Few strawberries are now canned anywhere. Most of these few are packed in Oregon and Washington, where the Redheart, Corvallis, and Ettersburg 121 are grown for this purpose. In the Middle West the Dunlap is used slightly for canning.

VARIETIES FOR SEVERE WINTER CLIMATES

In the upper Mississippi Valley it is essential that very hardy sorts be selected. Lack of moisture, drying winds, and low temperatures in winter combine to make very trying conditions, and only a very few sorts succeed there. Of the commercial sorts the Dunlap, Beaver, Burgundy, and Warfield are considered the hardiest. The Howard 17 (Premier) and Mastodon are also hardy in some parts of this region. The Early Cheyenne, Cheyenne 2, and Cheyenne 3, though not commercial varieties, can be grown in western North Dakota and South Dakota, in western Nebraska, and in Montana and Wyoming where other varieties are not hardy.

In western Oregon the Corvallis and Redheart are more hardy than the Ettersburg 121.

EVERBEARING VARIETIES

The Mastodon has large berries and better runner production than many other everbearing sorts. Its fruit is not so good in dessert quality as that of the Rockhill. The fruit of the Rockhill is as large as that of the Mastodon and is firmer and much better in quality, but the plants do not make runners freely. Among other varieties grown to some extent are the Gem, Gemzata, Streamliner, Montana Progressive, Progressive, Evermore, and Green Mountain.

VARIETIES FOR HOME GARDENS

The number of strawberry varieties for the home garden depends on the location in the United States, the size of the garden, and the proposed use of the berries. In most of the South gardeners may prefer the Suwannee because of its excellent flavor; however, if large quantities are to be preserved, the Blakemore may also be raised. In Maryland and Virginia the Suwannee (early) and Fairpeake (late) may be raised for eating fresh, the Blakemore for preserving, and the Midland for freezing for winter use. In western Oregon the Narcissa (very early), the Marshall (midseason), and Corvallis (late) are suggested; and the Brightmore is suggested for preserving and freezing.

For small gardens it is probably best to grow one variety—as, the Suwannee in most of the South, the Marshall on the Pacific coast, the Howard 17 (Premier) in the far North and upper Mississippi Valley region, and the Fairfax or Midland in the region from southern New England to New Jersey and west to Missouri.

Although strawberries are eaten largely because of their taste appeal, their food value should be properly recognized. Strawberries rank high as a source of vitamin C, averaging somewhat higher than oranges, lemons, or grapefruit. Varieties differ greatly. The Catskill, Fairpeake, Gandy, Clermont, Fairfax, Fairmore, and Marshall are above average in vitamin C content, the Howard 17 (Premier) and Blakemore about average, and Aberdeen much the lowest. The vitamin C content of a variety is generally highest when its flavor is highest and when it is reasonably fresh and not bruised. On preserving or freezing, strawberries may lose from one-sixth to about half their vitamin C content.

EVALUATION OF NEW VARIETIES

Occasionally new sorts that are superior to standard ones are introduced, but most of the introductions are inferior. The number of new

Figure 10.—**Seedbeds filled with seedling strawberry plants. The seed was planted the previous fall and the beds covered with a straw mulch that was removed early in the spring. On July 13, when the photograph was taken, about 15,000 seedlings had started; each one of these is potentially a distinct variety.**

varieties that may be introduced can be better realized by reference to figure 10, which shows beds containing about 15,000 seedlings, each one potentially a distinct variety. The breeder on whose grounds the photograph was taken has raised from 10,000 to 25,000 seedlings annually for many years and tested hundreds under field conditions, but he has introduced only a single variety. Other breeders in various parts of the United States are doing similar work. The best of the seedlings are introduced as new varieties, but on extended trial they may develop some weakness that makes them undesirable. Growers, therefore, should test new varieties before planting them extensively.

When new varieties are tested they should be set by the side of standard sorts and receive similar treatment. If a variety shows itself

very susceptible to leaf spot and other diseases it should usually be discarded after one crop is harvested; if it does not seem susceptible, the test should be continued for 2 or 3 years, as some seasons are more favorable than others. Furthermore, even in favorable seasons some varieties do not show some of their really important characteristics the first year. A 3-year test, however, will generally indicate the probable value of any new sort.

RUNNING OUT

It is often asserted that a strawberry variety may be very productive for a few years in certain sections and then run out, that is, become unproductive. Some sorts are said to run out quickly, in 2 or 3 years, and others in about 7 years, while the best run out in about 14 years. A glance at the record of some of the varieties grown at present should help to correct this view.

The Gandy was originated in 1885, the Joe before 1899, the Aroma in 1889, the Marshall in 1890, the Sample in 1894, the Klondike about 1896 (introduced in 1901), the Missionary about 1900, and the Chesapeake in 1903. The Jucunda, a variety grown slightly in Colorado till recently, was introduced before 1860. The Wilson originated in 1851 and was grown until recently in Oregon. At one time it was grown throughout the United States, but it has been replaced in most sections by varieties more resistant to disease and having larger, firmer berries with milder flavor. Since varieties having larger, firmer, and sweeter berries than the Wilson and other old favorites have been introduced, the standards have risen and are continually rising. Unconsciously old sorts are judged by new standards; although these old sorts do not seem to be as good as they once were, in reality probably many have not changed.

Where the yields of certain varieties have decreased markedly within a comparatively few years, various reasons may be assigned. In the South Atlantic, Gulf, and Pacific Coast States the summer bud nematode has been an important cause of failure. Another bud nematode is rather serious on the Delmarva Peninsula and in New England. In nearly all sections fungus leaf spots, botrytis fruit and stem rot, and, to a less extent, mildew have caused serious loss. In the Northern States the strawberry mite (cyclamen mite) is often serious. New varieties may be comparatively free from these troubles at the time of their introduction, but after a few years when new strains of the parasites appear they may prove so susceptible that they cannot be grown profitably. Therefore, although yields from certain sorts may decrease after a few years, even on soils the fertility of which has been maintained, it is probable that some disease or insect factor can be assigned as the cause of the reduced yield. Virus diseases have caused a decrease in yield on the Pacific coast and in some cases in the Eastern States.

In selecting varieties to plant, those resistant to disease should be chosen; as far as possible they should be selected from plantations relatively free from disease. If the fertility of the soil is maintained, if varieties that are very resistant to disease are set, and if reasonable care is exercised in propagation, no running out in the usual sense of the term is likely to occur.

DESCRIPTIONS OF THE MORE IMPORTANT VARIETIES

The descriptions herein are included to aid the prospective strawberry grower in his selection of sorts especially suited to his district and to the purpose for which he wishes to grow them. Only those varieties that are extensively grown in at least one section and promising new sorts that have been widely tested are listed here, and only those characteristics having a bearing on the commercial value of a variety are given. By using these descriptions in connection with the list of varieties arranged according to States and districts in table 1, the prospective planter should be able to select desirable sorts for his conditions. The meaning of the terms used in describing the form of berries can be understood by reference to figure 11. All varieties described are perfect-flowered.

Aberdeen.—New Jersey origin, about 1909. Berries medium large, conic, regular, soft, attractive light red, with seeds even with surface, with white core, mildly acid to acid, of fair quality; midseason to late. Plants vigorous, making runners freely. Because of its productiveness and late season, the Aberdeen is a commercial sort on heavy soils in New England and New Jersey. The fruit is too soft for distant shipment. The plants are highly resistant to red stele root disease but subject to leaf spot and leaf scorch.

Aroma.—Kansas origin, 1889. Berries large, round conic to short wedge-shaped, firm, bright crimson on surface with light-red flesh, mildly subacid, of fair quality; midseason to late. Foliage very healthy; plants making runners freely. The Aroma is a leading variety in Kentucky and southern Missouri; it is grown extensively in southern Illinois, Indiana, and Ohio. Its chief merits are the disease resistance of its foliage, the productiveness of the plants, and the firmness and attractive appearance of the fruit. It is a good shipping variety and is well adapted to the general market requirements. It is best adapted to silty or clayey soils. Tennessee Beauty is being tested to replace Aroma.

Beaver.—Wisconsin origin, 1918. Berries medium large, soft to medium firm, medium red, mildly subacid, of good quality; early. Plants vigorous, subject to leaf spot south of Wisconsin. Because of its resistance to drought and hot winds, the Beaver is liked in the upper Mississippi Valley region, though not so well in Minnesota as in Wisconsin.

Blakemore.—Maryland origin, 1923. Berries medium-sized, blunt conic, firm, bright, light red with light-red flesh, with yellow seeds, acid, of good quality; early. Plants vigorous, making runners very freely. Its firmness, earliness, and bright light-red color not darkening on holding make the Blakemore a leading market sort. Its firmness, ease with which it is capped (hulled), acidity, high pectin content, and light color make it especially desirable for preserving. It is now the leading variety of the United States and is recommended for the region from Georgia to southern New Jersey and west to Oklahoma and southern Missouri.

Brightmore.—Oregon origin, 1932. Berries medium-sized, firm, light to medium red, very glossy, with yellow seeds, subacid, of good quality; early. Plants rather small but making runners freely, resistant to leaf spot. Because the Brightmore is unusually good for frozen pack and preserving and is slow in taking virus diseases, it is promising in western Oregon and Washington.

Catskill.—New York origin; introduced 1933. Berries large, round conic, irregular, not firm, attractive, bright crimson with red flesh, mildly subacid, of good quality; early to midseason. Foliage healthy; plants making runners freely. Because of the large size and very attractive appearance of the fruit, productiveness, and healthy foliage, the Catskill is recommended as a midseason variety for home use and local market where the Howard 17 (Premier) is grown. In Maryland the berries are rather soft and of good but not high dessert quality.

Chesapeake.—Maryland origin, 1903. Berries large, round conic to short wedge-shaped, firm, bright crimson, with prominent seeds and light-red or whitish flesh, subacid, of good to very good quality; late. Foliage healthy; plants making few runners except in rich, moist soil. The Chesapeake is the leading variety grown under irrigation in the northeastern United States. It is also raised without irrigation in Maryland, Delaware, and New Jersey. It is liked because of its large, uniform, attractive fruit of good dessert and shipping quality and the relative freedom of its foliage from diseases and insects. Under irriga-

tion it is productive, and the fruit does not rot so badly as that of some other sorts. Because of its susceptibility to red stele root disease the Chesapeake is being replaced by the Temple on lowlands on the Delmarva Peninsula.

Dorsett.—Maryland origin, 1923. Berries large, long blunt conic, medium firm, very attractive, bright red with red flesh, mildly subacid, of excellent dessert

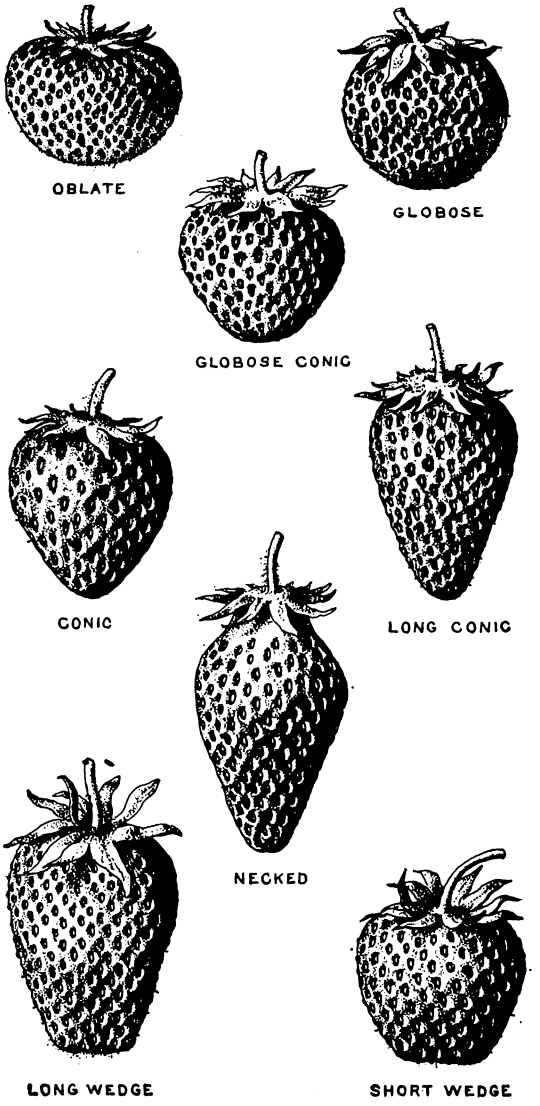

***Figure 11.*—Different forms of strawberry fruits, illustrating certain terms used in describing the varieties.**

quality; early. Foliage healthy; plants making runners very freely. Because of its high dessert quality, large size, attractiveness, and productiveness when the plants are not allowed to become too thick, the Dorsett has been grown from western North Carolina to New Jersey along the Atlantic seaboard. Fruit is not very firm but is not so soft as that of the Howard 17 (Premier). The variety is not productive when the plants are allowed to mat too thickly. It is most productive when the runners formed late in the season are picked off.

Dunlap.—Illinois origin, 1890. Berries medium-sized, conic, soft, dark crimson with deep-red flesh, subacid, of very good quality; early to midseason. Foliage susceptible to leaf spot and leaf scorch; plants making runners very freely; very hardy and drought-resistant. This variety is grown in northern Illinois, Wisconsin, Iowa, Minnesota, Nebraska, North Dakota, and South Dakota, doing best on clayey soil. The Dunlap is liked in the far North because the plants are very hardy and productive, the foliage healthy, and the berries of good dessert quality. They are too soft for shipping and are grown chiefly for home use and local markets. The Dunlap has been largely replaced by the Howard 17 (Premier) where that variety is hardy and to some extent by the Beaver.

Fairfax.—Maryland origin, 1923. Berries large, wedge-shaped to short blunt conic, very firm, very attractive, bright deep red with deep-red flesh, mildly subacid, of excellent dessert quality; medium early. Foliage very healthy; plants making runners rather freely. Because of its high dessert quality, large size, and the attractiveness of the berries, and productiveness the Fairfax is liked from southern New England south to North Carolina and west to Kansas. The berries are very firm, but because the color turns dark, like that of the Missionary and Marshall, they should be picked when they first ripen and marketed promptly. The Fairfax does not make runners so freely as the Dorsett; the fruit is much firmer, is milder in flavor, and is much darker than that of the Dorsett. The plants are especially productive when the runners formed late in the season are picked off.

Fairpeake.—Maryland origin, 1931. Berries large, wedge-shaped to short blunt conic, firm, light red, with pale flesh and yellow seeds, mildly subacid, of excellent dessert quality; late. Foliage healthy; plants making runners fairly freely. Because of its high dessert quality, large size, and productiveness it is promising from southern New England to North Carolina and west to Kansas.

Howard 17 (Premier).—Massachusetts origin, introduced as Howard 17, 1918. Berries medium-sized to large, long conic, soft, red with red flesh, subacid, of good quality; early, with long season. Foliage very healthy; plants generally making runners freely. The Howard 17 is the leading variety for market and home use in New England westward to northern Missouri and southern Minnesota. It is liked because of its exceptionally healthy foliage in most sections and its productiveness. It does well on a wide range of soil types. The fruit is not firm enough to ship to distant markets. The Howard 17 has been replaced by the Blakemore in Maryland and Delaware and northward in part by the Catskill because of its later season.

Joe (Big Joe).—New Jersey origin; introduced 1899. Berries large, round conic, firm, dark crimson with red flesh, subacid, of good to very good quality; midseason to late. Foliage healthy; plants making runners freely on good soil. The Joe is grown in Maryland, New Jersey, Delaware, and Pennsylvania. It is also grown to a less extent in all parts of the northern United States except parts of the Middle West having very severe winters. It is liked because of its large, attractive berries, which are good shippers, and because of its good dessert quality. The Joe is liked by many as well as the Chesapeake for intensive culture, and because it makes more plants than that variety it is sometimes more desirable. Sparkle may replace it in the North.

Klondike.—Louisiana origin, about 1896. Berries medium-sized, round or round conic (except in California, where they are necked), very firm, deep crimson to center, acid, of fair to good quality; early to midseason. Foliage subject to leaf spot and leaf scorch; plants making runners freely. The Klondike is still grown in the vicinity of Chadbourn, N. C., and Hammond, La., but it has been largely replaced by the Klonmore in the latter State. It is also grown extensively in southern California. Because of its deep-red color and firm flesh it is one of the best varieties for barreling for the ice-cream trade. The hulls, however, do not separate easily. The Klondike has been one of the best shipping varieties.

Klonmore.—Louisiana origin; introduced 1940. Berries below medium size, blunt conic, medium firm, light bright red, with yellow seeds, subacid, of medium dessert quality; very early. Foliage very vigorous, especially resistant to leaf spot; subject to leaf scorch; plants making runner plants very freely. Because it is earlier and far more resistant to leaf spot than the Klondike, the Klonmore is rapidly replacing the Klondike in Louisiana. The Klonmore is too small and too subject to leaf scorch to be grown farther north.

Lupton.—New Jersey origin; introduced about 1915. Berries large, short wedge-shaped, variable, often double, firm, very showy, of poor quality; late. Foliage resembling that of the Chesapeake, but susceptible to leaf spot. Plants make runners freely, best adapted to low ground. The Lupton is being grown

somewhat in southern New Jersey, Delaware, and Maryland. It is liked because of its remarkably handsome fruit, which has good shipping quality; on the Philadelphia and Boston markets it has commanded fancy prices. The berries, however, have coarse, dry flesh, which makes them low in dessert quality.

Marshall (Banner, Oregon).—Massachusetts origin, 1890. Berries large, round conic to conic, irregular, soft, deep crimson with deep-red flesh, mildly subacid, of excellent dessert quality; early to midseason. Foliage too susceptible to leaf spot in the East to be desirable; plants making runners rather freely; especially adapted to heavy soils. The Marshall has long been the standard of excellence in dessert quality. It is the leading variety in western Oregon and western Washington and is still grown to some extent in California. On the coast of California it fruits throughout the summer and is exceedingly productive. In Oregon and Washington it is grown extensively for freezing.

Massey.—North Carolina origin, 1934. Berries very large, short blunt conic, firm, light bright red, with yellow seeds, mildly subacid, of very good to excellent quality; late. Plants vigorous, making runners freely. Foliage resistant to leaf spot, but subject to leaf scorch. The large size of the fruit, high flavor, and bright light-red color not darkening on holding make the Massey the leading market sort in eastern North Carolina. The Massey is more vigorous than most other varieties there.

Mastodon.—Indiana origin, 1917; introduced 1924. Berries large, round conic, with sides often slightly furrowed, attractive, medium-dark scarlet red, with firm flesh with bright-yellow seeds, subacid, of fair quality. Plants developing a number of crowns and producing many runners for an everbearing variety. The Mastodon is hardy and productive in all strawberry regions where there is enough rainfall for the berries to develop. It is still the leading everbearing variety in the Eastern States. It is too soft for shipment during rainy periods and is not of high quality. In Minnesota, Oregon, and Iowa the Rockhill is superior to the Mastodon in flavor, resistance to leaf spot, and hardiness.

Midland.—Maryland origin, 1929. Berries very large, round conic, irregular, firm, deep glossy red with deep-red flesh, mildly subacid, of very good to excellent dessert quality; early. Foliage very vigorous, resistant to leaf spot and leaf scorch; plants not making runners very freely. Because of the large size, high flavor, good freezing quality, firmness, and earliness of the fruit and the productiveness of the plants the Midland is especially promising from southern New England and southern Michigan to Virginia and west to Kansas and Iowa.

Missionary.—Virginia origin, about 1900. Berries medium-sized to large, conic, soft to very firm according to the section in which grown, dark crimson with dark-red flesh, acid, of fair to good quality; early. Foliage fairly resistant to leaf spot; plants making runners freely. This variety is the standard sort for Florida and is still grown in the eastern part of North Carolina. In North Carolina the berries, however, are softer than those of the Blakemore. In Florida the berries are firm and excellent for shipping. They begin to ripen there in December or January and continue at least until April. Because of its long ripening season, its firm, attractive fruit, and the freedom of its foliage from leaf spot, the Missionary is considered more desirable than any other sort for that State.

Narcissa.—Maryland origin, 1923. Berries medium-sized, blunt conic, very regular, medium firm, attractive, bright crimson with red flesh, mildly subacid, of excellent quality; very early. Foliage healthy; plants making runners very freely. Because of its attractive berries of high dessert quality the Narcissa is recommended as a very early local-market and home-garden sort for the fertile sandy soils of the Pacific Northwest. It is only fairly firm and makes runners so freely that under the matted-row system the plants crowd each other so that they become unproductive.

Oregon.—All in the trade identical with Marshall (above).

Premier.—Introduced 1915. A synonym of Howard 17 (p. 28).

Redheart.—Maryland origin, 1923. Berries large, conic, irregular, with tough skin, firm, very attractive, glossy, deep crimson with bright-red flesh, subacid, of very good quality; midseason. Foliage subject to leaf scorch and leaf spot, large, glossy; plants making runners only fairly freely. The Redheart is grown chiefly for canning and freezing in western Washington and Oregon, being the best of all on the deep red hill soils for these purposes. It is also well liked in Idaho. It is too subject to leaf scorch to be grown in the Eastern States.

Redstar.—Maryland origin, 1933. Berries large, blunt conic, irregular, firm, medium red, subacid, of good to very good dessert quality; very late. Leaves very large, resistant to leaf spot and leaf scorch; plants making runners freely.

The Redstar is one of the latest good varieties and should be tried from Maryland to southern New England and west to Missouri and Iowa.

Rockhill (Wazata).—Iowa origin, 1918. Berries large, round conic to short wedge-shaped, irregular, medium firm, bright rich red with light-red flesh, subacid, of excellent quality. Foliage dark green, very healthy; plants making very few runners and are often propagated by crown division. An everbearer popular in Oregon, Minnesota, Iowa, and neighboring States because of its large size, attractive appearance, and excellent dessert quality.

Sparkle.—New Jersey origin, 1931. Berries usually medium-sized, sometimes small, short blunt conic to oblate, medium firm, glossy, rich medium red, mildly subacid, of very good dessert quality; medium late. Leaves medium-sized, resistant to leaf spot and leaf scorch; plants making runners very freely. The Sparkle is a very productive late variety of high flavor for trial in the Northeastern States. Reported as resistant to red stele root disease.

Suwannee.—Maryland origin, 1932. Berries medium-sized, necked, blunt conic, irregular, soft, light red, subacid, of excellent dessert quality; medium early. Foliage vigorous, resistant to leaf spot and leaf scorch; plants making runners very freely. Because of its excellent flavor, the Suwannee was introduced for the home garden for the southern United States from Maryland to south-central Georgia and west to Louisiana and Missouri.

Temple.—Maryland origin, 1937. Berries large, necked, blunt conic, regular, medium firm, medium red, mildly subacid, of very good dessert quality; medium early. Foliage vigorous, very resistant to leaf spot; plants making runners freely. The Temple is a high-flavored variety resistant to the red stele root disease. It succeeds well on the Delmarva Peninsula and has yielded well in New York State. On some high lands dead caps have been serious.

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